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TETRASTICHUS CECIDOBROTER (HYMENOPTERA: EULOPHIDAE), A NEW PHYTOPHAGOUS SPECIES DEVELOPING WITHIN THE GALLS OF *ASPHONDYLIA* (DIPTERA: CECIDOMYIIDAE) ON *ATRIPLEX* (CHENOPODIACEAE) IN SOUTHERN CALIFORNIA

Gordon Gordh and Bradford A. Hawkins

Division of Biological Control, Department of Entomology, University of California, Riverside, California 92521.

Abstract.—*Tetrastichus cecidobroter*, new species, is described and illustrated. Its larvae are phytophagous gall-formers within cecidomyiid galls in *Atriplex* spp. in the southwestern United States. This species is the third phytophagous *Tetrastichus* known.

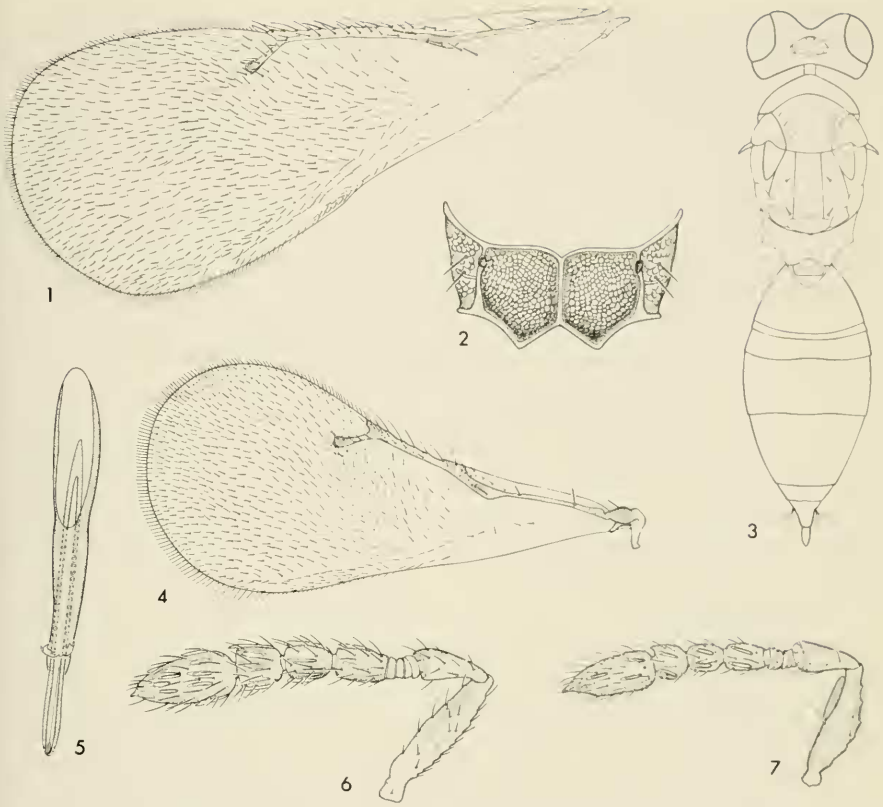
Ecological studies by one of us (BAH) on the gall fauna of *Atriplex* spp. in southern California have revealed an undescribed species of *Tetrastichus* which develops on modified plant tissue in galls caused by species of the *Asphondylia atriplicis* Cockerell complex. The novel biology of this wasp will be presented elsewhere. The purpose of this paper is to make a name available for this species. Descriptive terminology is principally after Graham (1961).

Tetrastichus cecidobroter Gordh and Hawkins, New Species

Figs. 1–7

Female.—Holotype 2.7 mm long; body black with very faint and limited bluish tinge in certain plays of light; antennal scape and pedicel tan, flagellum dusky; coxae black, femora similarly dark colored except apices pale; tibiae dusky mesad, basal and distal portions tan; pretarsi dusky, tarsomeres I–III nearly white; wings hyaline with bluish tinge in certain plays of light.

Head: Slightly wider than mesosoma, in dorsal aspect with weak irregular, transverse reticulate sculpture and scattered pale setae; frontovertex about 0.6× as wide as head; ocelli forming a strongly obtuse triangle surrounded by a superficial line of weakness. Head in dorsal aspect with scrobal impression broad and shallow, medially with 2 superficial lines of weakness diverging dorsad and terminating near median ocellus; paraocular area slightly more pubescent than vertex; toruli just dorsad of imaginary trans-



Figs. 1–7. *Tetrastichus cecidobroter*. 1, Female forewing. 2, Female propodeum. 3, Female habitus, dorsal aspect. 4, Male forewing. 5, Male genitalia. 6, Female antenna. 7, Male antenna.

verse line projecting between ventral margins of compound eyes; ventral margin of clypeus without tooth-like projections; area between ventral margin of clypeus and toruli moderately setose. Malar space about 0.7× as long as compound eye; malar sulcus well defined, complete. Antenna as illustrated (Fig. 6).

Mesosoma: Rather robust (Fig. 3); pronotum with posterior margin strongly arched, anterior face weakly striate or transversely reticulate, lateral face more boldly reticulate; posterior margin with a line of inconspicuous setae, lateral face with several pale setae. Middle lobe of mesoscutum boldly reticulate, without median line, with 5–8 inconspicuous adnotaular setae forming an irregular line (forming 2 irregular lines when 8 setae are present); lateral lobe of mesoscutum with sculpture less distinct (weakly, irregularly reticulate), and setal number 3–6. Scutellum weakly and minutely

longitudinally reticulate, with 2 inconspicuous setae laterad of each submedian longitudinal line, the cephalad setae just anterior of imaginary transverse line bisecting scutellum. Dorsellum minutely and weakly reticulate. Prepectus and mesepisternum boldly reticulate; anterior 0.6 of mesepimeron smooth and polished, posterior 0.4 boldly reticulate. Propodeum (Fig. 2) reticulate (usually boldly), with complete median carina and postspiracular carina; callus with 2 rather long, pale setae, sculpture less conspicuous. Hindcoxa boldly reticulate. Forewing as illustrated (Fig. 1), submarginal vein with 2 widely separated dorsal setae. Apex of hindwing not acute.

Metasoma: Conic-ovate, 1.6× as long as mesosoma; Tergum I smooth-polished, with 2 setae laterad; T II mostly concealed, but similarly smooth-polished and with 2 setae laterad; T III finely reticulate and with several setae laterad; T IV–VI finely reticulate and densely setose; epipygium densely setose; ovipositor and gonostyli slightly exserted.

Male.—Similar to female in habitus, coloration, sculpture, and chaetotaxy. Differing in smaller size, antennal segmentation and shape (Fig. 7), wing shape (Fig. 4), and genitalia (Fig. 5). Also more variation in coloration of tibiae (frequently very faintly dusky, nearly tan), and a third seta may be on the propodeal callus.

Material examined.—Holotype: ♀, California, Riverside Co., Palm Desert; 4/XI/1979; ex stem gall on *Atriplex canescens*; B. A. Hawkins, Collector. Paratypes: Palm Desert, 6 ♀, 3 ♂, 10/II/1979; 1 ♀, 3/III/1979; 4 ♀, 2 ♂, 22/VII/1979; 8 ♀, 5 ♂, 29/VII/1979; 1 ♀, 12/VIII/1979; 5 ♀, 2 ♂, 4/XI/1979. California, Riverside Co., nr. Valle Vista, 1 ♀, 11/V/1980; 15 ♀, 8 ♂, 15/VII/1979; 3 ♀, 2 ♂, 23/VII/1979; 4 ♂, 13/VIII/1979; 2 ♀, 20/VIII/1979; 2 ♀, 2 ♂, 27/VIII/1979; 1 ♀, 21/X/1979. California, Riverside Co., nr. Thermal, 3 ♀, 11/V/1980. All material collected and reared from cecidomyiid galls on *Atriplex canescens* by B. A. Hawkins.

Holotype, 5 ♀ and 4 ♂ paratypes deposited in the National Museum of Natural History, Smithsonian Institution, Washington, D.C. Remaining paratypes deposited in the Division of Biological Control, University of California, Riverside.

Etymology.—Cecido (Greek = gall), broter (Greek = eater).

Discussion.—In the most recent revision of the Nearctic *Tetrastichus* (Burks, 1943), *T. cecidobroter* runs to *T. cornus* Burks. The new species differs from *T. cornus* in that the head and thorax are not minutely shagreened, the toruli are located higher on the head, the submarginal vein bears only two dorsal setae, part of the thoracic pleuron is polished, and the propodeum lacks short anterolateral carinae. Burks (1963) subsequently described ten additional species of *Tetrastichus* from material taken in North America. *Tetrastichus cecidobroter* displays no affinity with any of these species.

Phytophagy has apparently evolved several times in the Chalcidoidea (see Gahan, 1922), but it is relatively uncommon in the Eulophidae. Only two species of *Tetrastichus* other than *T. cecidobroter* are known to be phytophagous. Ishii (1931) described *T. ardisiae* from material taken on *Ardisia japonica* (Thunb.) (Myrsinaceae) and reported that the portion of the shoot in which *T. ardisiae* developed "swells to some extent." Both *T. ardisiae* and *T. cecidobroter* are similar in having four ring segments in the female antenna. They differ in that the median ocellus of *T. cecidobroter* is not within the scrobal impression, the ventral margin of the clypeus is not toothed, the mesoscutum lacks a median groove, and the submarginal vein does not bear seven dorsal setae.

A more convincing case of phytophagy in *Tetrastichus* has been discussed by Teitelbaum and Black (1957) who report that a species "near *venustus*" develops on sweet clover (*Melilotus alba* Desc. and *M. officinalis* (L.) Lam.). This species has remained undescribed. Burks regarded it as morphologically indistinguishable from *T. venustus* Gahan, although the phytophagous form is thelytokous. Nikolskaya (1933) regarded *venustus* as a junior synonym of the well-known European species *T. brevicornis* (Panzer), but this synonymy has not been accepted in more recent catalogs (Domenichini, 1966; Burks, 1979).

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